

Remarks/Arguments

Summary

Independent Claim 1 was amended to delete a comma. The amendment was made as a matter of clarification. Claims 1-2, 4-10, 12-13, and 19-21 are currently pending in this application.

Claim Rejections – 35 U.S.C. § 102(b)

Claims 1, 5-6, 10, 13, and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,814,839 to Hosoba (hereafter, “Hosoba”). The rejection is respectfully traversed for at least the following reasons.

Regarding claim 1, the Office Action claims that Hosoba discloses “a recess (fig. 6)” (See, Office Action, section 4, lines 3-4). However, unfortunately the Office Action fails to point out any disclosure in Hosoba describing “a recess formed on a major surface of the n-type semiconductor layer, the recess *having a bottom surface, and sidewalls with a different planar orientation from the bottom surface*” (emphasis added) as recited in claim 1. To support a rejection of claim 1 under 35 U.S.C. § 102(b), it is insufficient for the Office Action to simply recite a recess. Instead, the Office Action must point out disclosure in Hosoba describing a recess *having all of the features of the recess recited in claim 1*. Because the Office Action fails to identify a recess in Hosoba having the features defined by claim 1, the rejection of claim 1 under 35 U.S.C. § 102(b) is improper and should be withdrawn.

In order to avoid any misinterpretation of the language of claim 1, claim 1 has been amended to remove a comma from the phrase “the recess having a bottom surface, and sidewalls”. It should now be clear that both the bottom surface and the sidewalls in this phrase relate to the recess.

Since the Office Action does not specifically indicate what part of Fig. 6 in Hosoba is considered to be a “recess”, it will be assumed that the so-called “recess” recited by the Office Action refers to either stripe-shaped V-grooves 51a₁ or corresponding V-grooves in active layer 53 shown in FIG. 6. (See, Hosoba at col. 24, lines 22-31). Unlike the recess of claim 1, the V-grooves do not have a bottom surface. The V-grooves simply consist of two planar slopes that meet at a lower intersection

point. *Id.* Moreover, as described by Hosoba, “each slope of the V-grooves 51a₁ [and therefore the V-grooves in layer 53] has an orientation of a (111) A plane.” (See, Hosoba at col. 24, lines 28-31). In other words, all surfaces of the V-grooves have the *same planar orientation*. The lack of the bottom surface in Hosoba and the different planar orientations of the V-groove slopes will cause profound differences in active layer 53 in terms of crystal growth characteristics, as well as the qualities of light emitted by the light emitting device. Since the V-grooves of Hosoba consist of various slopes, all having the same planar orientation, and no bottom surface at all, claim 1, which recites a recess having “sidewalls with a different planar orientation from the bottom surface,” clearly defines over Hosoba. Because claim 1 plainly defines over Hosoba, the rejection of claim 1 under 35 U.S.C. § 102(b) is improper and should be withdrawn.

The rejection of claims 5-6, 10, 13, and 21 under 35 U.S.C. § 102(b) is improper and should be withdrawn for at least those reasons described above in relation to claim 1. In addition, the rejection of claims 5-6, 12-13, and 21 is also improper for at least the following reasons.

Regarding claim 6, the Office Action plainly erred by discussing elements 250 and 310, which are nowhere to be found in Hosoba. The error appears to be an artifact from a previous Office Action discussing elements 250 and 310 of FIG. 4 of U.S. Patent No. 6,285,698 to Romano et al. (hereafter “Romano”). Because of this error, the Office Action fails to address the merits of claim 6, and therefore the rejection of claim 6 must be withdrawn.

Regarding claim 13, the Office Action claims, without providing any support for the claim, that Hosoba “teaches that the active layer 53 (fig. 6) emits light components having two or more different major peak wavelengths in which the light components are mixed to show a color.” (See, Office Action, page 3, paragraph 4). The Office Action’s claim is untrue. Hosoba never discloses emitting light components having two or more major peak wavelengths, nor does it disclose mixing the light components to produce a color. On the contrary, in relation to Fig. 6, Hosoba only discusses emitting light with *one* peak wavelength: “pure green emitted light...at a peak wavelength of 555nm” (See, Hosoba at col. 25, lines 45-47). Because Hosoba fails to disclose the subject matter of claim 13, the rejection of claim 13 is improper and should be withdrawn.

Claim Rejections – 35 U.S.C. § 103(a)

Claims 2, 4, 7-9, and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hosoba in view of Romano. The rejection is improper for the reasons explained above in relation to claim 1, and also for at least the following reasons.

In general, there is no motivation, teaching or suggestion either in the cited references or in the prior art as a whole to combine Hosoba with Romano. In fact, Hosoba and Romano both present a number of reasons why their teachings should not be combined. First, the purpose of grooves 255 in Romano is entirely different, and in some ways even contradicts, the purpose of V-grooves 51a₁ of Hosoba. For example, grooves 255 are formed in Romano to relieve *physical stress* in light emitting structures using InGaN grown over group III-V nitride layers. (See, Romano at col. 3, lines 6-11 and 47-53). In contrast, the structures of Hosoba are AlGaInP structures, which have different crystal structure properties from InGaN crystals and therefore do not suffer from the same physical stresses as the InGaN structures. V-grooves 51a₁ are formed in Hosoba to address various issues related to producing high intensity light. In addition, V-grooves 51a₁ are formed in GaAs substrate 51 before forming AlGaInP layers thereon in order to avoid performing multiple AlGaInP growth steps when forming layers 52-54 (See, e.g., Hosoba at col. 3, lines 63-65). In contrast, Romano forms layers 250, 310, and 320 by performing a “two-step epitaxial growth procedure, where the second growth step is performed on a pre-patterned surface” (See, Romano at col. 3, lines 33-36). The two-step procedure is used by Romano to give stability to the structure formed thereby (See, e.g., Romano at col. 3, lines 47-53).

Since the disclosures of Romano and Hosoba are designed to address different, and contradictory concerns that arise in different types of light emitting devices, one skilled in the art would not have combined the teachings of Romano and Hosoba as suggested by the Office Action. Further, since the device presented in Hosoba is specifically designed to *avoid* using a two-step growth procedure such as that suggested by Romano, one skilled in the art would not have combined Romano and Hosoba as suggested by the Office Action.

Regarding claim 2, the Office Action claims that it would be obvious to modify Hosoba in view of Romano so that semiconductor layers 52, 53, and 54 comprise gallium nitride layers. (See, Office Action at page 5, paragraph 1). However, as described above and in Romano, gallium nitride alloys have disadvantageous cleaving behavior and growth characteristics relative to other crystalline structures (See, Romano at col. 3, lines 5-32), making it unlikely that one would arbitrarily exchange the AlGaInP of layers 52-54 in Hosoba with gallium nitride layers as suggested by the Office Action. Further, the disclosure of Hosoba at col. 3, lines 28-31 appears to explicitly exclude group (III-V) nitrides such as gallium nitride from its device, giving even more reason why it would not be obvious to combine Hosoba with Romano.

Regarding claims 7 and 20, the Office Action again suggests that it would be obvious to substitute layer 52 with a gallium nitride layer. (See, Office Action at page 5, paragraph 2). However, for at least the reasons described above in relation to claim 2, it is not obvious to use gallium nitride.

Regarding claim 9, the V-grooves in active layer 53 of Hosoba do not form angles with each other at all. They are *parallel* when viewed from an upper surface, as clearly illustrated in Fig. 1B of Hosoba. Since the V-grooves do not even intersect each other, one of ordinary skill in the art would not have been motivated to "configure the planes with the specific angle" as suggested by the Office Action. (See, Office Action at page 5, paragraph 4). Further, it is unclear what such intersecting V-grooves would even look like in Hosoba, given the epitaxial growth process used to form the V-grooves in active layer 53.

Regarding claim 12, the Office Action discusses Romano without relating the disclosure of Romano to any part of Hosoba. For example, the Office Action fails to discuss any way in which the teachings of Hosoba and Romano could be combined to read on claim 12. Since Hosoba and Romano have different electrode configurations, it is unclear how or why one skilled in the art would modify Hosoba with the teachings of Romano to read on claim 12. Absent the elements required to form a proper obviousness-type rejection under MPEP 2143, the Office Action's rejection of claim 12 under 35 U.S.C. § 103(a) is improper and should be withdrawn. Further, as discussed in the March 3, 2006 response to the October 6, 2005 Office Action, the electrodes

shown in Fig. 4 of Romano are distinct from those recited in claim 12 and therefore even if combined with Hosoba, would not read on claim 12.

Claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hosoba, as applied to claim 1. The rejection of claim 19 is improper for at least the reasons described above in relation to claim 1, and also for the following reasons.

The Office Action's rejection of claim 19 does not address the merits of the claim. Instead, it appears to be a copy of the rejection of claim 9, which was probably mistakenly copied and pasted in the Office Action. Because of the error, the Office Action never discusses features of claim 19 such as the "repetitively corrugated shape with back-to-back side face angles of 120° and 240°." Because the Office Action fails to address the merits of claim 19, the rejection of claim 19 under 35 U.S.C. § 103(a) is improper and must be withdrawn.

Non-Statutory Double Patenting

Claims 1-2, 4-10, 12-13, and 19-21 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-19 of U.S. Patent Application No. 10/314,444, which has now been issued as Patent No. 6,876,009.

A terminal disclaimer is included with this paper in order to obviate the non-statutory double patenting rejection.

Conclusion

No further issues remaining, Applicants respectfully request allowance of the pending claims 1-2, 4-10, 12-13, and 19-21 is respectfully requested.

Respectfully submitted,

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Date: September 11, 2006

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